

Remarks

1. Introduction

Claims 15-25 are pending. Claims 15, 17, and 21 are independent claims.

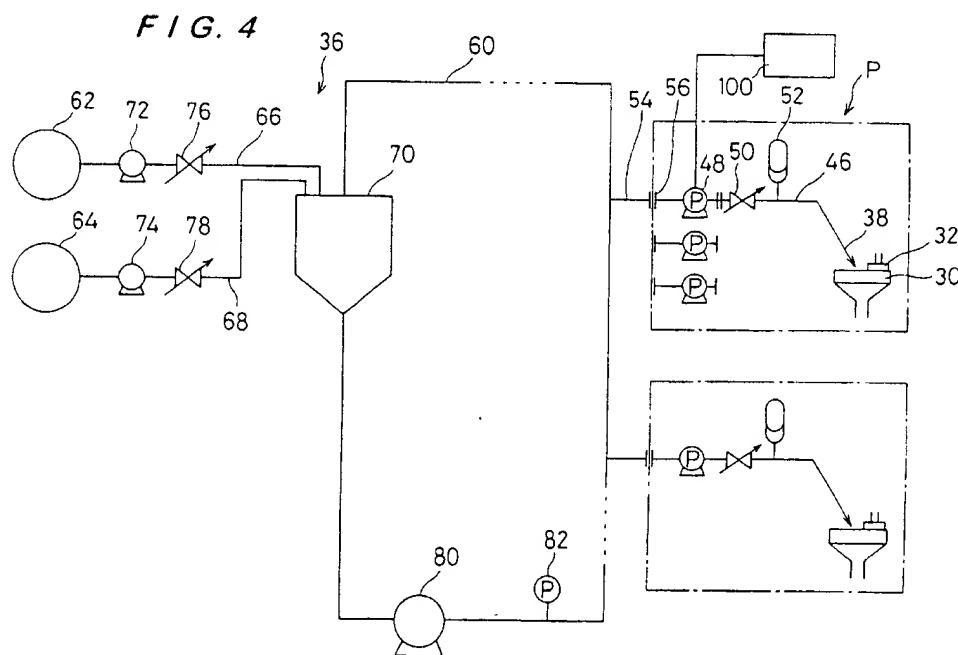
2. Rejections based on 35 U.S.C. §103(a)

Claims 15-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,086,457 (Perlov et al.) in view of U.S. Patent 6,413,154 (Togawa et al.). The Office Action stated that the Perlov reference discloses a first CMP polisher 50a, a second CMP polisher 50b, and a plurality of slurry suppliers 5236a-c. The Office Action further stated that the Perlov reference fails to teach which slurry suppliers supply oxidizer-free medium and which slurry suppliers supply oxidizing medium. In addition, the Office action stated that the Togawa reference teaches a stock solution which may include an acidic, alkaline, or neutral solution. The Office Action concluded that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Perlov apparatus with the teaching of employing different stock solutions with oxidizing liquid or oxidizer-free liquid as taught by Togawa. In the Response to Arguments section, the Office Action cited MPEP §2114 and stated that the manner of operating the device does not differentiate an apparatus claim from the prior art. The Office Action further stated that the manner or method in which the claimed machine is to be utilized is not germane to the issue of patentability of the machine.

As an initial matter, Applicants respectfully disagree with the Response to Arguments in the Office Action. The Response to Arguments stated that Applicants' argument, wherein the combined references do not teach the sequence of delivering oxidizer free medium prior to delivering oxidizer medium to the wafer, was immaterial under MPEP 2114. Specifically, the Office Action cited that a claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claims. Applicants do not contend that the claims recite that the apparatus may be intended to operate in a particular way. Rather, the claims recite, in part, "a delivery system adapted for delivering said oxidizer-free medium to a wafer in said polishing station prior to delivering said oxidizing medium to said wafer in said polishing station". See claim 15 (emphasis added). Therefore,

instead of merely reciting an intention for the delivery system, the delivery system of the claimed wafer polishing system specifically recites that it is adapted to deliver the recited sequence.

Moreover, the claims are not obvious in view of the Perlov and Togawa references, either alone or in combination. The Perlov reference teaches that the system may include a plurality of slurries 5236a-c. The Perlov reference, however, fails to teach: (1) any specific type of slurry, such as an oxidizing medium or an oxidizer-free medium; or (2) any sequence of application of the slurries. While the Togawa reference teaches that the slurry may be acidic or alkaline, Togawa fails to teach any sequence of application of slurries, and actually teaches away from the present invention. Togawa teaches a system which includes only one stock solution tank 62, as shown in Figure 4 of the Togawa reference:



The Togawa reference teaches that the single solution tank 62 "may include an acidic, alkaline or neutral solution containing abrasive particles such as silica-gel, depending on the nature of the workpiece". Col. 3, line 66 – col. 4, line 2. Thus, Togawa only teaches that the system may include one stock solution (i.e., only an acidic, alkaline, or neutral solution). There is no teaching or suggestion that the system includes both an acidic and an alkaline solution. In fact, there is a teaching away from including a system with both an acidic and an alkaline solution since the Togawa system only includes one stock solution tank 62. Even if one were to combine the Perlov and Togawa reference, there is no teaching or suggestion: (1) that both acidic and

alkaline solutions are delivered to a single wafer; or (2) that there is any sequence for application of the acidic or alkaline solutions.

By contrast, the claims presently recite: (1) delivering both an oxidizer-free medium and an oxidizing medium to a wafer; and (2) a sequence of delivering an oxidizer-free medium prior to an oxidizing medium to a wafer, as claimed in independent claims 15, 17, and 21. As discussed in the background section of the present application, previous surface planarization processes used a multi-step, multi-slurry approach:

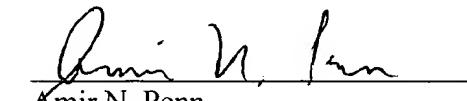
One previous process for copper-containing surface planarization utilized a multi-step, multi-slurry approach. In the first step, large amounts of copper are removed in bulk, leaving a thin, relatively planar copper layer for the second step. In the second step, the copper is further planarized to leave a continuous barrier layer with minimal topography. In both the first step and the second step, an oxidizing slurry is used in conjunction with a polishing pad in order to soften the copper by first oxidizing the copper to copper oxide so that it can be more easily removed. In a final step, a rotary buffer is used to completely remove the barrier layer and leave clean, corrosion free copper and oxide surfaces.

Page 2, lines 12-21. Thus, the prior art referenced in the application, which used oxidizing slurry in the first and second steps, is consistent with the teachings of the cited references. In contrast, the present claims recite a delivery sequence of an oxidizer-free medium, and then an oxidizing medium. While the Togawa generally teaches that the stock solution may be acidic, alkaline or neutral, the combination of references fail to teach or even suggest delivering both an acidic and an alkaline solution to a single wafer. Rather, the Togawa reference teaches a single stock solution tank 62 which may be supplied with “an acidic, alkaline **or** neutral solution”. Col. 3, line 67 (emphasis added). Moreover, the Togawa reference is completely silent as to the sequence of controlling the supply of slurries to a wafer. Thus, applicants believe that the independent claims in the present application, and the claims which depend thereon, are patentably distinct over the cited references.

3. Conclusion

Applicants respectfully submit pending claims 15-25 are allowable in their present form, and hereby request allowance of claims 15-25. If any questions arise or issues remain, the Examiner is invited to contact the undersigned at the number listed below in order to expedite disposition of this application.

Respectfully submitted,



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